

WHAT IS CLAIMED IS:

1. A method for cleaning wastewater comprising
locating wastewater brine into a tank;
circulating the brine under pressure through a heat exchange media to
heat the brine to between about 220 to about 230°F (104-110°C);
5 decreasing the pressure of the heated brine during re-introduction of
the pressurized, heated brine into the tank by an amount effective to transform at least
a portion of water from the brine from liquid to steam; and
removing the steam from the tank.
2. The method of claim 1, wherein the flash tank has a conical
10 bottom.
3. The method of claim 1, wherein the brine is pressurized by
circulating the brine upstream against the head of the heat exchanger.
4. The method of claim 3, wherein the brine is circulated at about
7 feet per second.
- 15 5. The method of claim 1, wherein decreasing the pressure is by
passing the pressurized, heated brine through a fog nozzle.
6. The method of claim 1, wherein the pressure is decreased from
about 25 psi (37.2 Pa) to about atmospheric pressure.
- 20 7. The method of claim 1, further comprising passing the vapor
phase through a demister.
8. The method of claim 7, further comprising introducing the
steam to an air stream for atmospheric venting, condensing the steam to form water.

9. The method of claim 1, further comprising filtering a portion of the brine from the flash tank to remove solids.

10. The method of claim 9, wherein the solids are dewatered.

11. The method of claim 10, wherein the filtering and dewatering is
5 by a filter press.

12. An apparatus for removing contaminants from the aqueous wastewater stream comprising

a tank;

10 a heat exchanger having an inlet and an outlet, the inlet being in fluid communication with the tank through a pump; and

a fog nozzle disposed in the tank, the fog nozzle being in fluid communication with the outlet of the heat exchanger.

13. The apparatus of claim 12, wherein the tank has a conical bottom.

15 14. The apparatus of claim 12, wherein the tank is further in fluid communication with a filter apparatus.

15. The apparatus of claim 12, wherein the filter is a heated plate press.

20 16. The apparatus of claim 12, wherein the tank further comprises a vapor outlet in fluid communication with a demister.

17. The apparatus of claim 16, wherein the demister further comprises a vapor outlet in fluid communication with a stream of air or a condenser.

18. An apparatus for control and/or monitoring of continuous evaporation of water from a wastewater brine, comprising

an evaporator system for separating clean water from brine;

5 at least one sensor for monitoring parameters associated with the evaporator and producing a sensing signal;

a controller for receiving the sensing signal and generating a control signal; and

a control device responsive to the controlling signal for controlling the evaporator.

10 19. The apparatus of claim 19, wherein the evaporator system comprises a tank; a heat exchanger having an inlet and an outlet, the inlet being in fluid communication with the tank through a pump; and a fog nozzle disposed in the tank, the fog nozzle being in fluid communication with the outlet of the heat exchanger.

15 20. The apparatus of claim 19, wherein the sensor is a pressure sensor, mass flow sensor, volume flow sensor, specific gravity sensor, density sensor, level sensor, infrared sensor, or temperature sensor.

20 21. The apparatus of claim 19, wherein the sensor is a pressure sensor inside the tank, a pressure sensor between the pump and the inlet valve of the heat exchanger, a pressure sensor between the heat exchanger and the nozzle, a temperature sensor inside the tank, a temperature sensor inside the heat exchanger, a temperature sensor between the outlet of the heat exchanger and the nozzle, a mass flow sensor at an inlet to the tank, a level sensor inside the tank, a specific gravity sensor inside the tank, pressure sensor inside the tank, a pressure sensor inside the bubbler tube, a level sensor inside the defoamer tank.

25 22. The apparatus of claim 19, wherein the control device is a valve, a pump, a bubbler tube, or a heater.

23. The apparatus of claim 19, further comprising a filter press.
24. The apparatus of claim 23, wherein the sensor is a pressure sensor, mass flow sensor, volume flow sensor, specific gravity sensor, moisture sensor, density sensor, level sensor, infrared sensor, or temperature sensor.